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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/065,750 | 11/15/2002 | Cheng-Jye Liu | 8711-US-PA | 7526 |
| 31561 | 7590 | 10/24/2003 | EXAMINER | |
| JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE 7 FLOOR-1, NO. 100 ROOSEVELT ROAD, SECTION 2 TAIPEI, 100 TAIWAN | | | LUU, CHUONG A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2825 | |
| DATE MAILED: 10/24/2003 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

MJC

| | | | |
|------------------------------|----------------------|---------------------|--|
| Office Action Summary | Applicant No. | Applicant(s) | |
| | 10/065,750 | LIU ET AL. | |
| | Examiner | Art Unit | |
| | Chuong A Luu | 2825 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-21 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
 5) Claim(s) 13-21 is/are allowed.
 6) Claim(s) 1-6 and 8-12 is/are rejected.
 7) Claim(s) 7 is/are objected to.
 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 11) The proposed drawing correction filed on ____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ . | 6) <input type="checkbox"/> Other: ____ . |

DETAILED ACTION

Inventorship

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e); (f) or (g) prior art under 35 U.S.C. 103(a).

PRIOR ART REJECTIONS

Statutory Basis

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The Rejections

Claims 1-6 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kluth et al. (U.S. 6,376,341 B1) in view of Wolf et al. (Silicon Processing).

Kluth discloses a method for fabricating a memory cell with

(1) forming a silicon oxide (26)/silicon nitride (28)/silicon oxide (30) (ONO) stacked layer (24) on a substrate (23), the ONO stacked layer (24) consisting of a bottom oxide layer (26), a silicon nitride layer (28) and a top oxide layer (30); forming a masking layer (protective layer) (36) on the ONO stacked layer (24); patterning the masking layer (protective layer) (36) and the ONO stacked layer (24) to form a plurality of stacked patterns (see Figure 6); removing the masking layer (protective layer) (36), which becomes layer (34) (see column 6, lines 66-67);

(3) wherein a thickness of the bottom oxide layer is about 50-150 Å (50-100 Å) (see column 5, lines 28-29);

(4) wherein a thickness of the silicon nitride layer is about 50-200 Å (55-80 Å) (see column 5, lines 35-43);

(5) wherein a thickness of the top oxide layer is about 50-150 Å (70-120 Å) (see column 5, lines 44-46);

(6) the the masking layer (protective layer) (36) comprises silicon nitride (see column 5, lines 49-50);

(9) wherein the ONO stacked layer (24) is patterned until a portion of the bottom oxide layer (26) is exposed "on the sidewall" (see Figure 6);

(10) wherein the exposed bottom oxide layer (26) is removed after the ion implantation is performed (see Figures 3-5);

(11) wherein the insulator comprises silicon oxide (50) (see column 6, line 67).

Kluth discloses the claimed invention except for wherein an etching rate of the protective layer is lower than an etching rate of the top oxide layer; wherein removing the protective layer comprises using wet etching to remove the protective layer; and specific thicknesses of ONO layer. However, Wolf discloses silicon processing for the VLSI ERA with (1).... wherein an etching rate of the protective layer is lower than an etching rate of the top oxide layer (see pages 532-534); (2) wherein removing the protective layer comprises using wet etching to remove the protective layer (see pages 532-534). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine the teachings of Kluth and Wolf by applying wet etching process to remove the protective layer and selecting the optimized thickness of ONO layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and In re Aller, 105 USPQ 233.

Claims 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kluth et al. (U.S. 6,376,341 B1) in view of Wolf et al. (Silicon Processing) and further in view of Randolph et al. (U.S. 6,538,270 B1).

Kluth and Wolf disclose everything above except for forming a plurality of word lines on the substrate; wherein the word lines comprise polysilicon. Furthermore, Randolph discloses an array of memory cell with (8) further comprising:..... forming a plurality of control gate electrode (228) (word lines) on the substrate (see column 4, lines 24-29. Figure 6); (12) wherein the control gate electrode (228) (word lines)

comprise polysilicon (see column 4, lines 26-27). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kluth, Wolf and Randolph to complete a memory cell by forming a word lines above the bitline to extend the life of the memory cell.

Allowable Subject Matter

Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 13-21 are allowed.

The following is an examiner's statement of reasons for allowance: The examiner has reviewed the prior art in light of applicant's claimed invention and finds that the claims define over the prior art. The prior art does not disclose or suggest inter alia the limitations ".....the protective layer having a thickness smaller than 50 Å....."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuong A Luu whose telephone number is (703)305-0129. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (703)308-1323. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.



Chuong Anh Luu
Patent Examiner